

# Temperature Validation Report

by Steven Pawson

Based on presentations by:

Hyunah Lee (HIRDLS)

Michael Schwartz (MLS)

Thierry Leblanc (Lidar-MLS)

Robert Herman (TES)

and the discussion that followed

# Summary of Validation

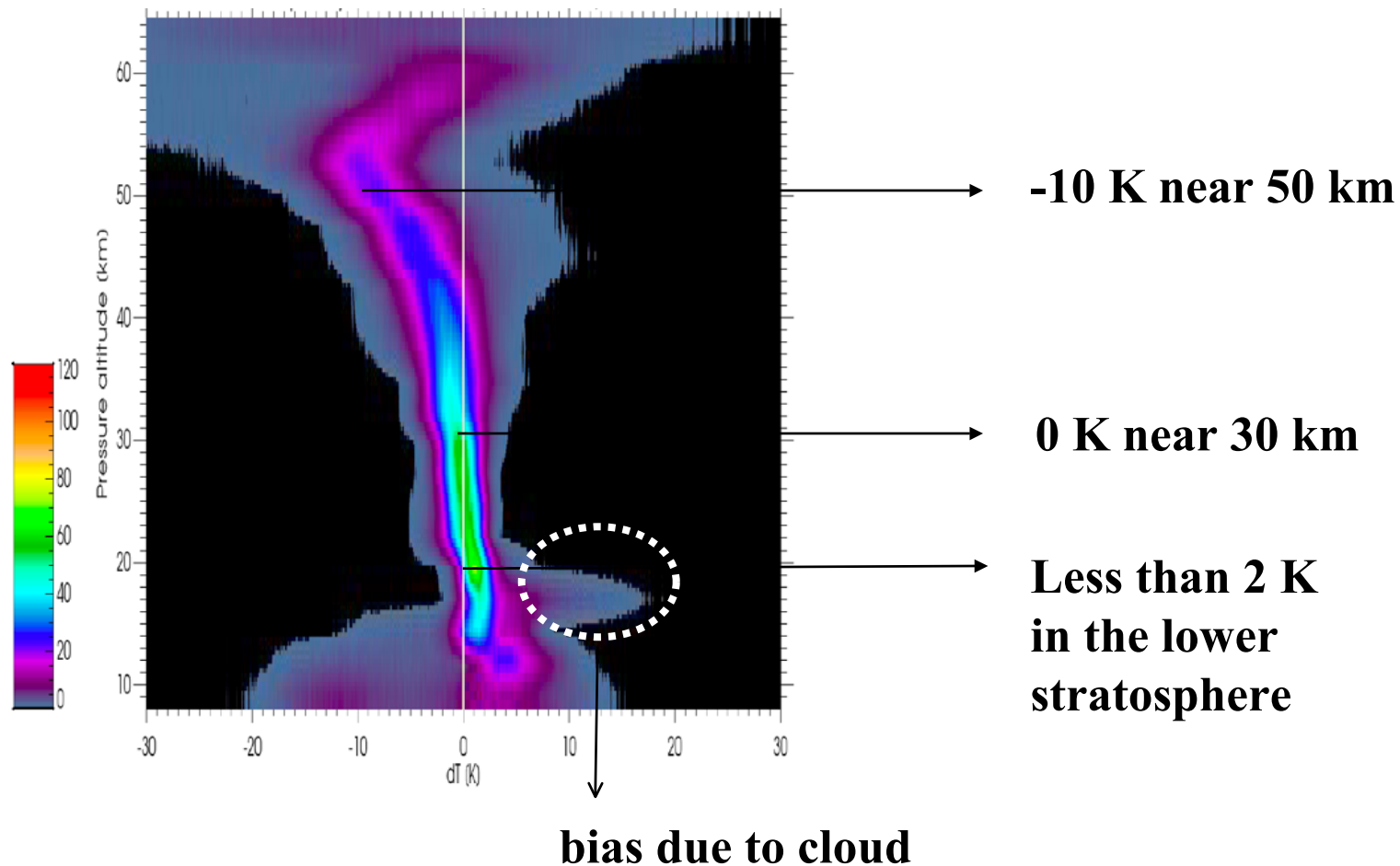
- Wide range of comparisons performed:
  - Aura - Aura
  - Aura - other sensors
  - Aura - in-situ
  - Aura - meteorological analyses
- Biases and differences:
  - Relative biases isolated
  - Absolute biases sometimes clear
  - Can explain some differences
- Next-generation algorithms being developed

# HIRDLS Summary

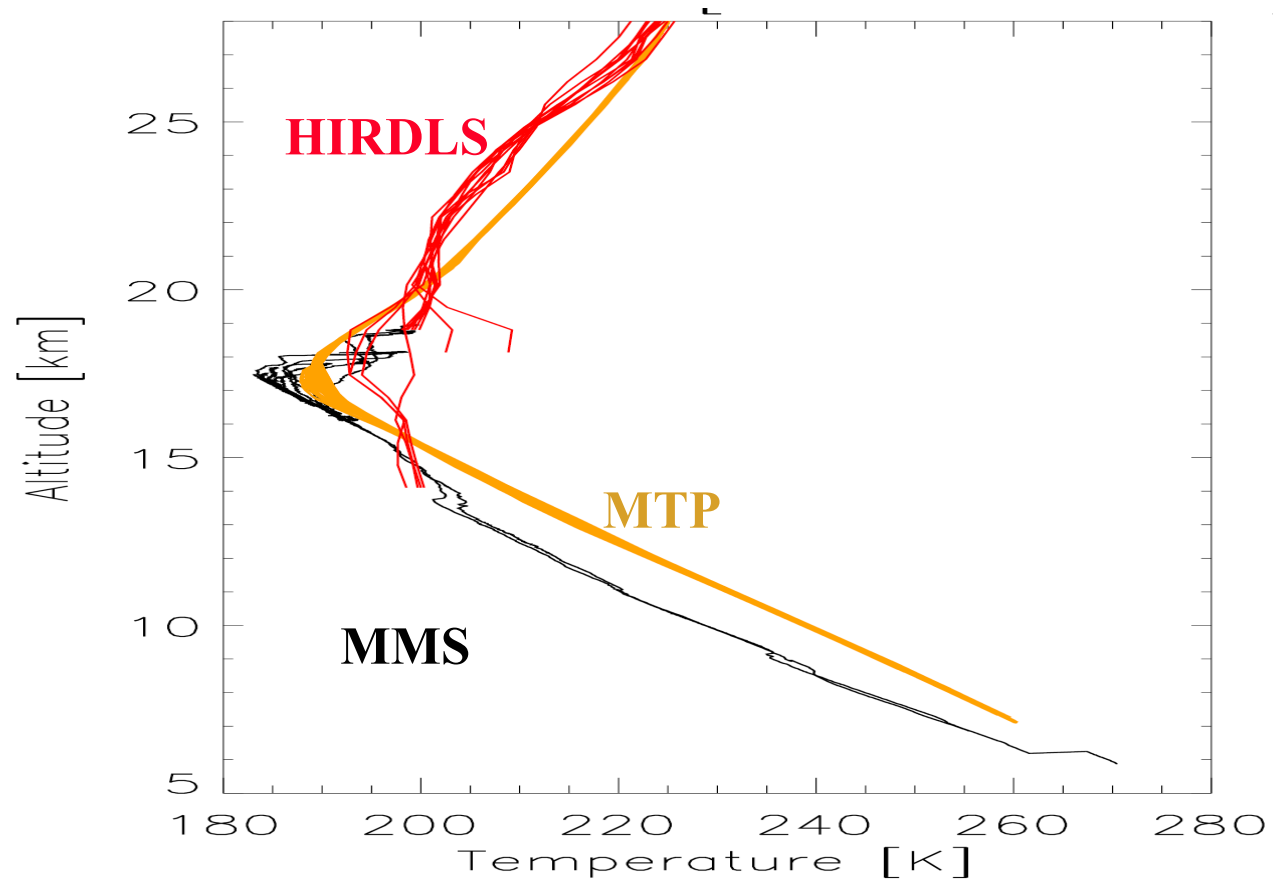
- HIRDLS v2.0 biases, mainly due to Kapton correction algorithm:
  - GEOS-4: -10 K near 50 km, 0K near 30 km, and less than 2 K in the lower stratosphere.
  - MLS: -1 K bias in the lower stratosphere.
- HIRDLS-MTP/MMS differences near tropopause:
  - Differences of more than 5K can occur
  - These are because of incorrect cloud detection.

# Systematic bias in HIRDLS

4-31 May 2006



# CR-AVE : HIRDLS, MTP, MMS

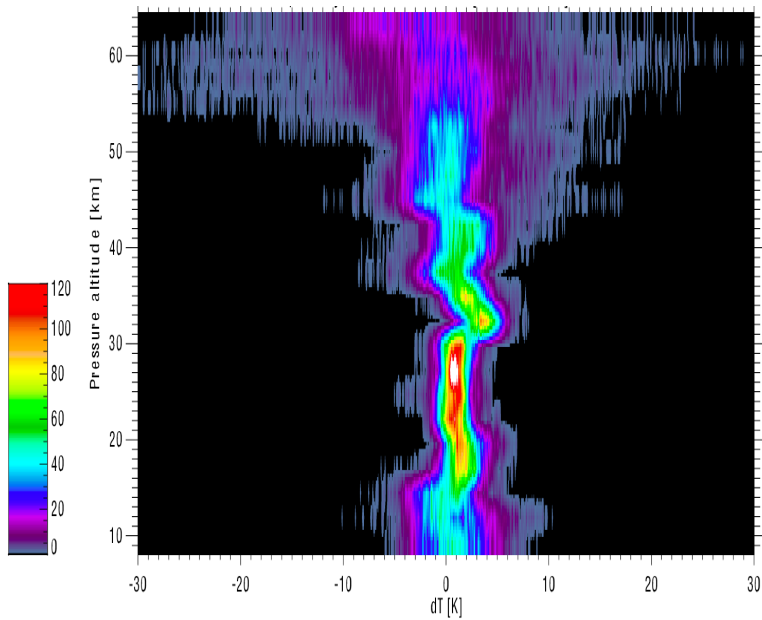


# MLS Summary

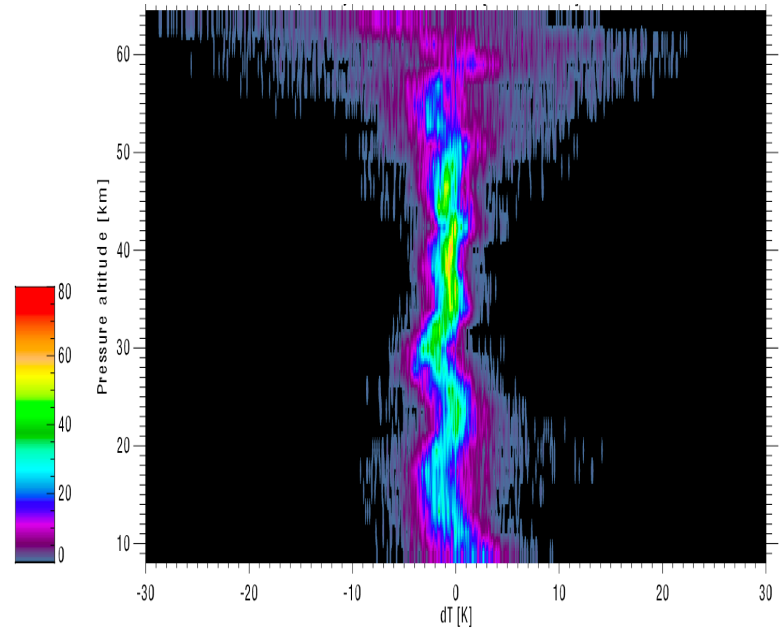
- Validated V1.5 and V2.1 of data (V2.2 soon)
- Vertical resolution in troposphere of V2 is better (~5 vs ~8 km)
- Bias in stratosphere decreased in V2.1:
  - +3K in V1.5 to slightly negative values
  - Reduces geopotential heights in strat/mesosphere
- Zig-zag of ~2K in lower stratosphere of V2.1: arises from merging of different radiances in this region
- Radiance closure improved at higher levels in V2.1, but not evident in comparison with ACE

# MLS - GEOS-4

**MLS v1.5**



**MLS v2.1**



# MLS-CHAMP Comparison

QuickTime™ and a  
TIFF (LZW) decompressor  
are needed to see this picture.

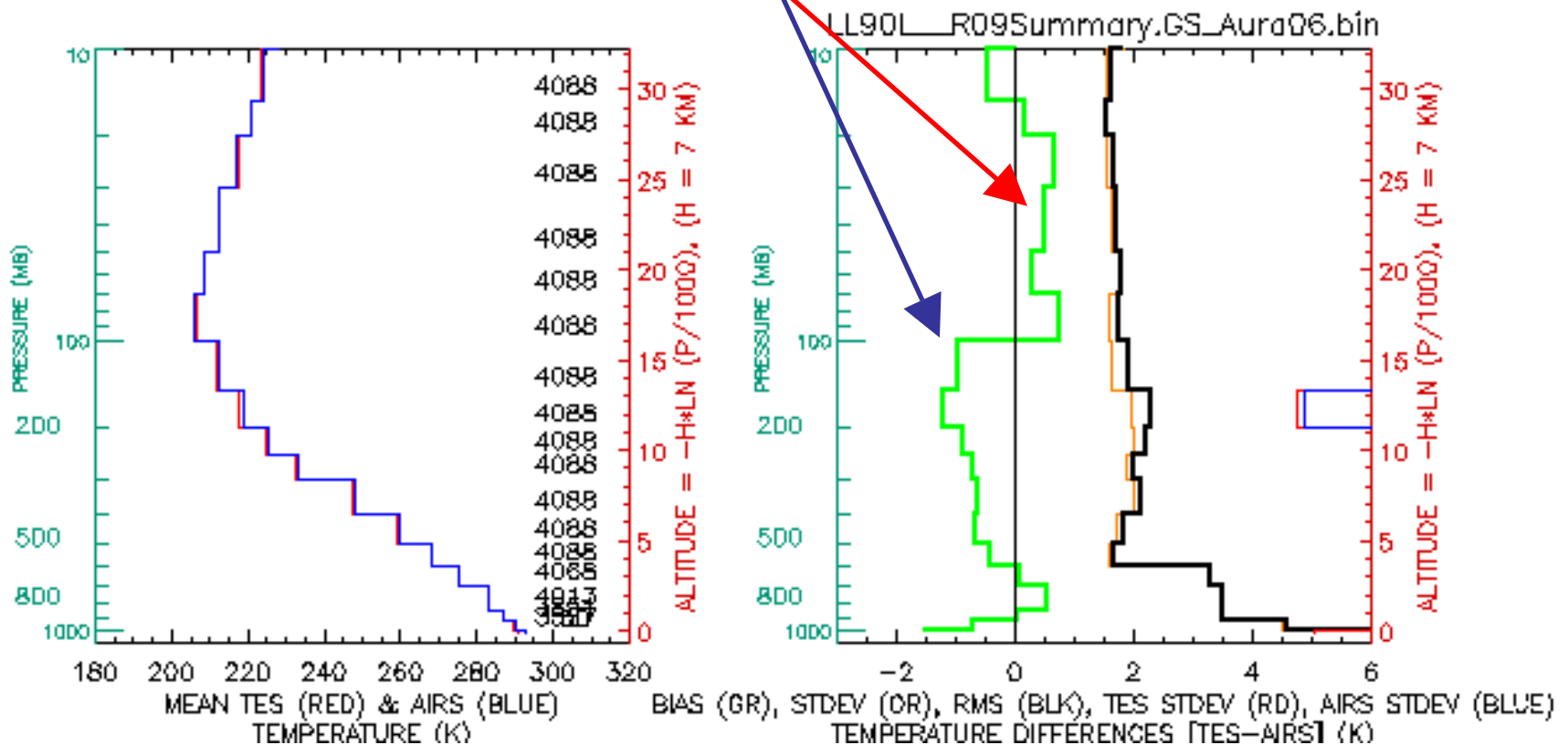


# TES Summary

- v002 TES T has a cold bias relative to AIRS of -0.5 to -1.2 K at 100-600 hPa.
- Similar bias seen in comparisons to sondes, aircraft, and GEOS-4.
- Next release (v003) of TES will use CO<sub>2</sub> spectroscopy to determine T.
- Future validation needs: TES limb temperature validation and high-latitude correlative measurements.

# TES (GS) vs AIRS

TES cold bias -0.5 to -1.2 K at 100-600 hPa relative to AIRS.  
TES warm bias 0.0 to +1.5 K at 20-100 hPa relative to AIRS.



Mean profiles

TES - AIRS

Bias in green [TES-AIRS],  
rms differences in black

# Summary of Discussion

- Expect most comparisons to be included in instrument validation papers
- Comparisons of “validation” datasets would be useful - value of an atlas?
- Availability of additional datasets (e.g., COSMIC) should be examined
- Quality of meteorological analyses needs documenting
- Will follow up with email, possibly phone conferences, to ensure progress